

DISK BRAKE FOR A BICYCLE

2 BACKGROUND OF THE INVENTION

3 1. Field of the Invention

4 The present invention relates to a disk brake, and more particularly to a
5 disk brake for a bicycle and having a low friction to make the operation of the
6 disk brake smooth.

7 2. Description of Related Art

With reference to Fig. 3, a conventional disk brake for a bicycle in accordance with the prior art comprises a body (50), a lever (52) and a driving device (60). The lever (52) is pivotally attached to the body (50) and is connected to a handle bar through a cable. The driving device (60) is mounted in the body (50) and is connected to and actuated by the lever (52). The driving device (60) comprises a driving member (62), a ball bearing (70), a gasket (72), three steel balls (64), a driven member (63), a biasing member (not numbered), a locking piece (66), a locking nut (not numbered) and two brake pads (68). The driving member (62) is rotatably mounted in the body (50), and the ball bearing (70) is mounted between the drive member (62) and the body (50) to make the driving member (62) rotation at a low friction. The gasket (72) is mounted around the driving member (62) and abuts against the ball bearing (70) to support the balls of the ball bearing (70). The driving member (62) has three guiding recesses (622) to respectively the steel balls (64) in the guiding recesses (622). The driven member (63) is reciprocally mounted in the body (50) and abuts the steel balls (64) to hold the steel balls (64) in place between the driving member (62) and the driven member (63).

1 The biasing member mounted between the driven member (63) and the
2 locking piece (66) to provide a restitution force to the driven member (63). The
3 locking piece (66) is secured in the body (50) to hold the biasing member in
4 place. The locking piece (66) has a central hole (not number) defined to allow the
5 driven member (63) to extend through the central hole. The locking nut is
6 secured in the body. The brake pads (68) are mounted in the body (50) and face
7 each other. The brake pads (30) are respectively held in place by the driven
8 member (63) and the locking nut.

9 When the user pulls the handle bar, the lever (52) will be actuated to
10 pivot relative to the body (50) to rotate the driving member (62) with the lever
11 (52). The driven member (63) will be pushed to move relative to the body (50),
12 and the brake pads (68) will be pushed to squeeze a disk mounted on a wheel of a
13 bicycle. Accordingly, a braking effect is provided.

14 However, because the gasket (72) contacts with each ball of the ball
15 bearing (70) at a single point, the pressure between the gasket (72) and the balls
16 of the ball bearing (70) is huge. The surface of the gasket (72) is easily scraped,
17 and slight scrapes are formed on the surface of the gasket (72). Consequently, the
18 surface roughness of the gasket (72) is increased, such that the friction between
19 the gasket (72) and the ball bearing (70) is also increased to make the operation
20 of the disk device not smooth.

21 To overcome the shortcomings, the present invention tends to provide a
22 disk brake to mitigate or obviate the aforementioned problems.

23 **SUMMARY OF THE INVENTION**

24 The main objective of the invention is to provide a disk brake for a

1 bicycle and having a low friction to make the operation of the disk brake smooth.
2 The disk brake has a body, a lever and a driving device. The lever is pivotally
3 mounted on the body. The driving device is mounted in the body and has a
4 driving member, a driven member, two brake pads, a ball bearing and two
5 washers. The driving member is rotatably mounted in the body and is connected
6 to and actuated by the lever. The driven member is reciprocally received in the
7 body and is connected to and actuated by the driving member. The brake pads are
8 mounted in the body, and one of the brake pads is connected to the driven
9 member. The ball bearing with multiple balls is mounted in the body and around
10 the driving member. The washers are mounted around the driving member and
11 place the ball bearing between the washers. Each washer has a contact side
12 facing to each other and an annular groove with a concave bottom defined in the
13 contact side to receive the balls of the ball bearing in cooperation with the groove
14 in the other washer. Accordingly, the contact area between the balls and the
15 washers will be enlarged, and the surfaces of the washers are not easily scraped
16 or damaged.

17 Other objects, advantages and novel features of the invention will
18 become more apparent from the following detailed description when taken in
19 conjunction with the accompanying drawings.

20 **BRIEF DESCRIPTION OF THE DRAWINGS**

21 Fig. 1 is an exploded perspective view of a disk brake in accordance with
22 the present invention;

23 Fig. 2 is an enlarged side plan view in partial cross section of the ball
24 bearing and the washers of the disk brake in Fig. 1;

1 Fig. 3 is an exploded perspective of a conventional disk brake in
2 accordance with the prior art; and

3 Fig. 4 is an enlarged side plan view in partial cross section of the gasket
4 and a ball of the ball bearing of the conventional disk brake in Fig. 3.

5 DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

6 With reference to Figs. 1 and 2, a disk brake for a bicycle in accordance
7 with the present invention comprises a body (10), a lever (12) and a driving
8 device (20). The body (10) is securely attached to a frame of the bicycle. The
9 lever (12) is pivotally attached to the body (10) and is connected to a handle bar
10 through a cable. The driving device (20) is mounted in the body (10) and is
11 actuated by the lever (12). The driving device (20) comprises a driving member
12 (21), a driven member (22), two brake pads (26), a ball bearing (30) and two
13 washers (34).

14 The driving member (21) is rotatably mounted in the body (10) and is
15 connected to and actuated by the lever (12). The driven member (22) is
16 reciprocally received in the body (10) and is connected to and actuated by the
17 driving member (21). To connect the driven member (22) to the driving
18 member (21), multiple guiding recesses are respectively defined in the driving
19 member (21) and the driven member (22). Multiple steel ball (23) are
20 respectively mounted in the pairs of facing guiding recess in the driving
21 member (21) and the driven member (22).

22 The brake pads (26) are mounted in the body (10), and one of the
23 brake pads (26) is connected to the driven member (22) to move with the

1 driven member (22). To connect the brake pad (26) to the driven member (22),
2 a magnet (not shown) is secured in one end of the driven member (22) to
3 attract the brake pad (26) onto the driven member (22). In addition, a biasing
4 member (not numbered) is mounted around the driven member (22) to provide
5 a restitution force to the driven member (22).

6 The ball bearing (30) with multiple balls is mounted in the body (10)
7 and around the driving member (21). In an optional embodiment, the balls of
8 the bearing (30) are rotatably mounted on an annular ball holder (32). The
9 washers (34) are mounted around the driving member (21) and place the ball
10 bearing (30) between the washers (34). Each washer (34) has a contact side
11 facing to each other and an annular groove (342) with a concave bottom
12 defined in the contact side to receive the balls of the ball bearing (30) in
13 cooperation with the groove (342) in the other washer (34).

14 With the arrangement of the grooves (342) with concave bottoms in the
15 washers (34), the contact area between the balls and the washers (34) are
16 enlarged. Accordingly, the pressure between the balls and the washers (34) is
17 reduced, so that the surface of the washers (34) will not be scraped or damaged
18 and can be kept at an excellent smoothness. This can make the operation of the
19 disk brake smooth and at a low friction.

20 Even though numerous characteristics and advantages of the present
21 invention have been set forth in the foregoing description, together with details
22 of the structure and function of the invention, the disclosure is illustrative only,
23 and changes may be made in detail, especially in matters of shape, size, and

- 1 arrangement of parts within the principles of the invention to the full extent
- 2 indicated by the broad general meaning of the terms in which the appended
- 3 claims are expressed.